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Teacher insights into the barriers and facilitators of learning in autism

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ABSTRACT

Background: Little is known about the factors impacting on learning for autistic pupils, even though academic outcomes are highly heterogeneous. The aim of the current study was to qualitatively explore factors that are perceived to impact positively (i.e. facilitators) and negatively (i.e. barriers) upon learning for primary school pupils with an Autism Spectrum Disorder diagnosis.

Method: Semi-structured interviews were conducted with ten teachers currently engaged in teaching autistic pupils, which were analysed using thematic analysis.

Results: Three key themes were identified: *pupil's behaviours and abilities* (factors related to the child's behaviour, cognition or personality), *academic environment* (physical and contextual), and *teacher skills and qualities* (e.g. training, trust and relationships).

Conclusions: A range of factors were therefore identified by teachers, some of which corroborate with existing research, while other findings provide novel insights. Priorities for facilitating learning are discussed, as well as key areas for future investigation and potential intervention.

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterised by difficulties in social communication and interaction, and the presence of restricted and repetitive behaviours (Diagnostic and Statistical Manual; American Psychiatric Association, 2013). Individuals with ASD form a highly heterogeneous group, not only in relation to this dyad of characterised features, but also with regards to broader aspects of functioning. For example, academic outcomes for individuals with a diagnosis of ASD are highly variable; while some pupils achieve within the average range in reading and maths, others perform from below, through to well above, average (Keen, Webster, & Ridley, 2016). Different profiles of strengths and weaknesses at the individual level have also been identified, particularly in relation to reading and maths achievement (Chen et al., 2019; Kim, Bal, & Lord, 2018). For example, analysis of a sample of 114 children with ASD revealed two subgroups; a "low achieving" group with poor maths ability compared to reading, and a "high achieving" subgroup with the opposite profile (Chen et al., 2019). Understanding why this variability exists is vital for developing strategies to best support autistic pupils in school, enabling the best possible outcomes.

Indeed, research into the potential factors impacting academic outcomes for pupils with ASD has been conducted. In their review of the literature, Keen et al. (2016) found that eight studies had explored potential predictors of academic outcome, including i) cognitive predictors, such as IQ or early speech (e.g. Mayes-Dickerson & Calhoun, 2008; Venter, Lord, & Schopler, 1992), ii) behavioural

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predictors such as sensory processing (Ashburner, Zivani, & Rodger, 2008), iii) social skills (Estes, Rivera, Bryan, Cali, & Dawson, 2011), iv) autism severity (Eaves & Ho, 1997), and v) environmental predictors, such as involvement in talented and gifted programmes (Assouline, Foley Nicpon, & Dockery, 2012). As evident in this list, the majority of studies considering predictors of achievement in autism have so far focused on characteristics of the child, as opposed to external factors. Keen and colleagues highlighted the need to explore a wider range of factors to identify the most important issues for targeted interventions. Furthermore, the factors that best predict academic achievement have to date been considered using quantitative and experimental research, which have enabled empirical manipulation and collection of data for specific factors. Despite this, due to the nature of quantitative research only a few factors can be considered within a single study, making it difficult to pinpoint the factors that best predict outcome and which should be given the most attention in future research or intervention. Qualitative research, however, can provide rich and detailed information regarding real experiences within the classroom (that might be missed in standardised experimental testing) to guide the focus of future research. To date, few studies within this topic have adopted qualitative methods.

Many qualitative studies in this field turn to the experiences of teachers for informative insights. Teachers most frequently and routinely observe pupils in the context of the classroom and can therefore provide informative perspectives on how different factors may influence the way in which pupils in their class learn. It is also known that teachers' quantitative ratings of various aspects of behaviour, such as attentiveness or autistic symptoms, appear reliable (Constantino et al., 2007; DuPaul, Power, McGoey, Ikeda, & Anastopoulos, 1998). It therefore follows that their qualitative perspectives on the experiences of autistic pupils in the classroom represent valuable insights for driving forward research and considering how best to support pupils. Indeed, some researchers have used teacher perspectives to investigate similar issues for pupils with autism, such as the challenges of teaching Physical Education (Obrusnikova & Dillon, 2011), tools to support mainstream inclusion (Able, Sreckovic, Schultz, Garwood, & Sherman, 2015; Schultz, Able, Sreckovic, & White, 2016), and the challenges faced by college students with an autism diagnosis (Gobbo & Shmulsky, 2014).

In addition to these studies published in peer-reviewed journals, Oswald, Coutinho, Johnson, Larson, and Mazefsky (2008) discuss potential barriers to school success for individuals with an ASD (i.e. Asperger's Syndrome prior to DSM-5). Parents, teachers and pupils were interviewed and/or completed a survey regarding the implementation of a team-based approach to supporting pupils with ASD. Ten key barriers and challenges to school success were identified, including difficulty with social interactions and communication, cognitive rigidity, attention and learning difficulties, sensory differences, and emotional distress. The authors also make their own recommendations for addressing these barriers, for example, the use of visual schedules to keep students oriented on task during the school day. Although the authors do not offer any discussion of how these factors impact upon learning, they provide initial perspectives into possible issues autistic pupils in the classroom may face. A more focused investigation of these issues would provide valuable insights into the important factors and *how* they may impact upon learning.

Before investigating the barriers and facilitators of learning faced by autistic pupils, it is important to recognise that although there may be factors that impact children broadly (e.g. executive function, socio-economic status; Best, Miller, & Naglieri, 2011; Sirin, 2005), different groups of children face different barriers to learning. For example, barriers to learning for fostered children include high mobility (i.e. frequent change in school/placement) and feelings of disempowerment (Morton, 2015; O'Sullivan & Westerman, 2007). Furthermore, Bedell et al. (2013) found that parents of children with disabilities (sample represented children with physical and intellectual impairments) reported the physical and social demands of activities to be the biggest barrier to participation in school. Although some factors may be important for children broadly, it is vital to identify the barriers and facilitators to learning for specific groups (such as pupils with ASD) in order to appropriately tailor educational practices.

Given the gap in the literature outlined above, the aim of this study was to investigate the factors that teachers feel are important for learning in the classroom for pupils with an ASD, as well as how they perceive these factors to influence learning. Importantly, this study considered both facilitators of and barriers to learning to understand factors from both positive and negative perspectives. To achieve this aim, semi-structured interviews were conducted with teachers to obtain rich qualitative data for analysis. As autistic primary school pupils can attend either mainstream schools or access Special Educational Needs (SEN) provision, teachers working in a

Table 1
Participant demographics.

Teacher	School type	Current role	Years teaching overall	Years supporting autistic pupils	Number of autistic pupils currently teaching/supporting	Age range of pupils taught (years)
1	Mainstream with SEN	SENCO	20	20	10	5–11
2	SEN	Class teacher	11	7	8	5–16
3	Mainstream with SEN	HLTA	N/A	26	1	5–11
4	SEN	Class teacher	10	10	4	7–10
5	Mainstream with SEN	Class teacher	14	9	7	5–9
6	Mainstream	Class teacher	5	5	3	5–6
7	SEN	Class teacher	3.5	6	7	5–8
8	Mainstream	SENCO	15	15	6	8–9
9	Mainstream	Class teacher/SENCO	12	12	2	4–5
10	SEN	Class teacher (completing teaching qualification)	1	5	5	5–16

range of school provisions were interviewed for a rounded insight.

2. Method

2.1. Participants

The characteristics of the sample are presented in Table 1. Ten teachers (9 female) of pupils with autism took part and worked in mainstream primary schools (N = 3), mainstream primary schools with SEN provision (N = 3), or SEN schools (N = 4). Most participants were working as a class teacher (N = 7), but two were dedicated Special Educational Needs Co-ordinators (SENCOs) with reduced class teaching responsibilities, and one was a Higher Level Teaching Assistant (HLTA). One of the class teachers was currently completing their teaching qualification, but all other teachers (with the exception of the HLTA) were fully qualified as primary school teachers. Participants were recruited via social media (i.e. Facebook and Twitter), and through the research team's existing contacts. Participants gave written informed consent prior to taking part.

2.2. Semi-structured interview

The semi-structured interview comprised two parts: (1) demographics, and (2) barriers to and facilitators of learning in the classroom. Part 1 included questions about how long they had been teaching overall and more specifically supporting a pupil with autism, the current number of pupils they were actively involved in supporting, and the age range of these pupils. Part 2 focused on questions about what teachers felt were the biggest barriers to, and facilitators of, learning. Specifically, they were asked "Thinking about children with autism, can you tell me a little bit about the most important factors that you feel negatively affects a child's ability to learn in the classroom?" and "Thinking about children with autism, can you tell me a little bit about the most important factors for supporting a child's ability to learn in the classroom?" For each factor the teacher referred to, the interviewer followed up with questions regarding the perceived impact upon learning, and whether teachers felt the factors were specific to autism or not (e.g. referred to pupils more broadly). The purpose of asking about both barriers and facilitators was to encourage participants to discuss factors that both positively and negatively impact on behavior and learning. Participants were interviewed individually, either in their school or at the university. Part 2 of the interviews lasted between 30 and 50 min and were audio recorded and later transcribed.

Data-driven thematic analysis (Braun & Clarke, 2006) was used to analyse the transcripts. Thematic analysis is a method unconnected to any ontological or epistemological frameworks and allows for a data-driven approach to analysis, as opposed to theory-driven methods such as content or discourse analysis. It is also a flexible approach that subsequently provides a rich and detailed account from the perspective of participants (Nowell, Norris, White, & Moules, 2017).

The first stage of the thematic analysis was to identify codes within the data. As this was an exploratory analysis, bottom-up inductive coding was used to analyse the content of the transcripts. Examples of codes at this initial stage included "preparing for change" and "clear expectations". A second independent researcher double coded data from 20% of participants, selected at random, and 100% inter-rater agreement was obtained. In the second stage, patterns between codes were identified and grouped into themes. For example, codes such as "preparing for change" and "clear expectations" were considered to be related and were grouped along with codes such as "targets" and "planning".

Once these themes were established, codes were returned to and reassessed and/or refined within the context of the themes.

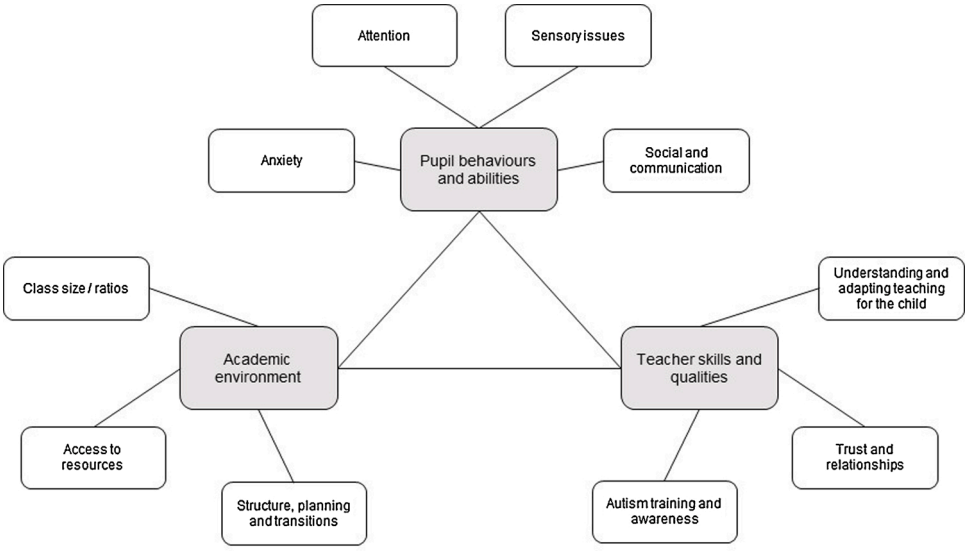

Fig. 1. Thematic map of themes and sub-themes identified.

Finally, themes and sub-themes were defined (Fig. 1).

3. Results

It is important to note that all teachers referenced the individual differences seen between children with autism, therefore although they were asked to talk about autistic children in general, they recognised that individual differences existed and noted an important factor for one child may not be important for another child.

Although teachers were asked about barriers and facilitators of learning in two separate questions of the interview, there was significant overlap with regards to what teachers discussed across questions. For example, the same factors impacting on learning could be discussed both in terms of a barrier and a facilitator of learning (e.g. the presence of facilities/equipment was considered a facilitator, but the absence of it was a barrier). As a result, the analysis focused on all factors mentioned, recognising that these could be related to learning in either a negative or positive manner.

Responses from teachers on the whole fit into three main themes: i) pupil behaviours and abilities (i.e. factors related to the child's behaviour, cognition or personality), ii) academic environment (i.e. the physical environment and resources as well as the way in which learning is experienced), iii) teacher skills and qualities (e.g. teacher's understanding of autism and the individual child, ability to develop and manage relevant relationships). In the following results section, each of the themes will be described in turn, accompanied by examples to illustrate the themes that were mentioned within context.

3.1. Pupil behaviours and abilities

All teachers (N = 10) spoke about factors they felt impacted on learning that were related to the pupil's behaviour, abilities or experience, making this a prominent theme across all participants. This theme was central to most of the experiences described by teachers, given that most strategies or resources aimed to support these behavioural or cognitive differences. Within this, four sub-themes were identified, these being anxiety, attention, sensory issues and social and communication. Although these were identified as independent sub-themes, there was a clear relationship between these aspects of the child, particularly with regards to anxiety, sensory issues and attention. These relationships are represented in the chosen quotations.

Teachers described sensory issues as having an impact on the learning experience of children with autism, which was often related to an inability to focus or time taken from the day to support their sensory needs. Teachers gave examples of occasions where sensory sensitivity could lead to an inability to concentrate on the task at hand:

> *"(he) flaps a lot, gets out of his seat, makes noises, traces things, and that issue with sensory processing has a direct impact on his education because if I'm standing teaching, he literally cannot concentrate on me"* – (T7)

Teachers also spoke about adapting the classroom environment in order to accommodate for sensory differences, though this was not necessarily straightforward due to the needs of other children in the classroom:

> *"it's hard when you've got classroom full of different children with autism because what's right for one isn't necessarily right for another. Someone might prefer the lights on full whereas the other it might hurt their brain when the lights are on full, so you might have to dim them a bit"* – (T10)

Nearly all teachers (N = 9) described the impact of anxiety on the learning experiences of children with autism. As with sensory sensitivity, the consensus generally seemed to be that if a child is experiencing anxiety, it becomes all-encompassing so the child can't focus on their work and they could miss out on learning:

> *"their anxiety levels go so up so high they can't think"* – (T1)

> *"some of our high functioning autistic children have the highest levels of anxiety … it can be little things like they want a drink but the drink's near the sink … so that stops them from doing any of the learning because they're so focused on getting their water bottle"* – (T9)

Although attention was most regularly mentioned in relation to anxiety and sensory differences, as per the above quotes, it was also described as impacting learning directly. Teachers described occasions where an autistic child's attention may not be appropriately directed, and that they may require support with on-task attention maintenance:

> *"she spends a lot of time kind of in her own world and sometimes she's listening to what I'm saying, sometimes really not and isn't able to do her jobs without somebody sitting with her"* – (T6)

Five teachers (SEN, N = 4; Mainstream, N = 1) reported that a pupil's ability to communicate effectively was important for accessing learning, both in terms of receptive and expressive communication. Teachers described the importance of communication as a gateway to accessing learning, in that if a child is not able to effectively communicate or understand what is being asked of them by the teacher, then they are unable to engage in the learning process. Equally, poor communication could lead to frustration and subsequently cause disengagement from the learning:

> *"The most obvious difficulty that they encounter on a day to day basis is communicating effectively … and that becomes really, really frustrating really, really quickly for our children. They switch off, the learning just doesn't happen if they can't access whatever communication is going on"* – (T2)

Linked to this, social skills were also described as relevant for the learning experience, in that differences in social interactions could be misunderstood, which may lead to difficult situations with staff or peers:

"(they) might not do or say the best things to other members of staff, might be a bit more… at more risk of getting themselves in bother by saying the wrong thing" – (T1)

Social and communication difficulties were seen to impact on learning in situations where group or paired work was necessary, and teachers spoke about the need to support autistic children to develop those skills:

"even those skills to be able to share and play come into like if you're doing an activity or a task and you've got to have a partner and you've got to have shared resources or whatever it's very difficult for children when they first come in and they don't- haven't developed any of those skills yet"– (T7)

3.2. Academic environment

Teachers referred to various aspects of the academic environment that were significant for learning. This included physical or concrete aspects of the school environment, as well as the way in which learning is experienced. The latter tended to focus heavily upon structure and planning in relation to the school day, in that this was vital for many children to be able to engage with learning. Often, these factors were discussed in relation to the child's behaviors or abilities in that they could help or hinder the difficulties that the child experienced at the individual level.

Nine teachers across types of school provision described the importance of structure; a lack of structure can be anxiety inducing and therefore distracting for pupils with autism. Providing structure, typically in the form of a visual timetable or providing clear objectives for a task, allows pupils to accept what's coming next and focus on the task at hand:

"it (visual timetable) helps them to structure how their day is going to go, so they then can sit down and concentrate on what's going on rather than being anxious or kind of not knowing what's going on" – (T6)

"they need to know what's coming up…so it does help to have that physical timetable and then they're not as anxious and they can participate and learn" – (T9)

Other resources or strategies for supporting learning in autism were mentioned, such as timers, rewards, or breaking down work. These were described as being important for supporting the child to focus, whether directly, or indirectly by reducing anxiety and in turn facilitating engagement in learning:

"some of them if you give them a timer and say right I want you to write for this long or you've got that long to do it then that will work well with them" – (T5)

"we have distraction boards and things where, you know, portable boards that we can put round the tables for children as well to, to try and stop a lot of what's going on" – (T3)

"some children see a certain amount of work and straight away [gasps] can't do it so one strategy would be to cut the worksheet up and reduce the amount that's in front of them" – (T1)

Three teachers, two from mainstream schools and one from SEN, spoke about the relevance of having access to appropriate facilities and equipment, in that it can allow children to access learning that they are otherwise too distracted to access:

"(the equipment) might help the children to feel calmer or to do their jobs which otherwise they would be too distracted to do, or to listen in carpet time or to access small group work, whereas they might need to be one to one other wise… I've had children who if they're sat with a weighted blanket on their knee can sit on a chair and do a job at a table, but without that (they) can't and need to be up and moving" – (T6)

Access to resources was also considered to be linked to receiving a diagnosis of autism. Without a diagnosis, funding may not be available which can lead to a lack of the necessary resources to support children appropriately:

"I've had a little girl who…came to my class and she wasn't able to access anything and because we didn't have a support plan or any money coming in, I couldn't give her anything more than the TA who was (sometimes in) my class… so she spent a lot of time distressed, not accessing anything because I didn't have anyone to work with her" – (T6)

Four teachers (Mainstream, N = 3; SEN, N = 1) referred to the ratio of children to staff within a class, and how they view this to impact on the learning experience of the pupils with autism in the class. Teachers spoke about the challenges of supporting children with autism alongside a large number of other children in the class, several of whom may have their own needs:

"without the extra adults I have…they wouldn't make anywhere near as much progress 'cause I just wouldn't be able to spend the time I need to with them" – (T6)

"it's alright knowing that sitting next to someone and holding their arm is gonna help them through a maths lesson, but if you've got 30 other kids and you've got other children with SEND needs … the size of your class can make that an impossible thing as a teacher" – (T8)

3.3. Teacher skills and qualities

Another key theme encompassed aspects of the teacher that were relevant for learning in autism, which included an understanding of autism, the child, and the importance of relationships. As with the previous theme, it was clear that this was related to the behavior and abilities of pupils, in the sense that the teacher needed an understanding of the child with autism in order to adapt their teaching appropriately.

Understanding the nature of autism, but also what it means for that individual child, was considered important in order for a teacher to provide the pupil with appropriate support:

> *"You need an understanding of what ASD is but you also need an understanding of what that child's profile is…so what's the sensory needs, what are their strengths and weaknesses as an individual child? … (if) you don't match your teaching to how that child learns … then it's likely to have an emotional and anxiety effect on that child and therefore they could shut down or they might be disruptive in their behaviour and what you're not getting is that place where any academic learning can happen"* – (T8)

As well as understanding the child, teachers spoke about the importance of using that understanding to be able to adapt their teaching approach with a particular child in order to provide the most effective learning experience:

> *"it's kind of a bespoke approach almost for every kid and the way you sort of target or tailor things"* – (T2)

Related to this, teachers also highlighted the importance of building relationships with autistic pupils, not only understand them, but to gain their trust, leading to a willingness to engage in learning activities:

> *"trust (is important) and for the child to know you get them, you understand. My staff are so good at building the relationships with the children"* – (T1)

Relationships with parents and external agencies such as educational psychologists or clinicians were also considered to be important, to allow to teacher to provide relevant support for a specific autistic child:

> *"I think that it's really important that you work with parents and any other external agencies so that you are all having the same conversation and you're all working from the same knowledge base and you're sharing information"* – (T8)

4. Discussion

Teachers discussed the factors that they believe to impact learning for children with autism over a range of different areas, highlighting the breadth of potential challenges to accessing learning faced by autistic pupils, as well as a wealth of possible ways to overcome these barriers and support learning in the primary school classroom. Some of these findings such as sensory issues and anxiety corroborate with existing qualitative research (Able et al., 2015; Oswald et al., 2008) and experimental work (Ashburner et al., 2008; Miller et al., 2017), while other findings such as the implied relationships between anxiety, attention and learning are believed to be novel insights gained from this study and research approach. This approach also enabled a range of factors to be considered within a single study, which allowed potential relationships between factors to be identified. The interviews were therefore highly informative and valuable in terms of identifying areas that require further investigation and/or attention in relation to making appropriate school and classroom adaptations. We now discuss these findings, their relation to existing literature, and implications for future research.

Pupils' own behaviour and abilities were the most regularly discussed factors, mentioned by all teachers as having an impact on learning, which supports existing experimental work. Previous research has found social skills and communication (Estes et al., 2011; Miller et al., 2017), anxiety (Oswald et al., 2016), sensory processing (Ashburner et al., 2008) and attention (McDougal, Riby, & Hanley, 2020) to be related to academic outcomes in ASD, which aligns with the themes reported by teachers in the current interviews. Most of these themes were also identified by Oswald et al. (2008), who found communication, social skills, attention difficulties, sensory differences, motor co-ordination and emotional distress (e.g. anxiety) to be potential barriers to learning for students with AS. The novel contribution that the present study adds, however, is the teacher perceptions of how these factors may impact upon learning for autistic children within the context of daily school life. With regards to this, attention appeared to be implicated in some instances; for example, a child experiencing anxiety could be so distracted by their worries that they are unable to focus their attention on a task, impacting on the quality or quantity of their learning. This concept was particularly prominent in descriptions surrounding anxiety and sensory issues, but was present throughout the discourse. This finding corresponds with existing quantitative research, which has shown that attention is related to learning in autism (Hanley et al., 2017; May, Rinehart, Wilding, & Cornish, 2013; Mayes & Calhoun, 2007). Furthermore, existing research has shown that attention is related to sensory processing (Ashburner et al., 2008) and anxiety (Reinholdt-Dunne, Mogg, Vangilde, Bradley, & Esbjorn, 2015; Richards, Benson, Donnelly, & Hadwin, 2014), strengthening the notion that attention may mediate the relationship between these behavioural factors and academic achievement.

Relationships between behaviour/cognition and other factors also existed, for example, some teachers spoke about a lack of structure causing anxiety in children with autism, leading to distraction and reduced engagement with the learning material. Teachers did however identify the usefulness of visual timetables and other resources to structure the school day, which support pupils for whom lack of structure could be stressful. Providing structure to both the day and individual lessons so that pupils could plan ahead was considered to be important, which is a strategy previously recognised within the literature in relation to autism (e.g. Helps, Newsom-Davis, & Callias, 1999; Humphrey, 2008). It is well established that a preference or need for routine is a core feature of autism (e.g. "inflexible adherence to routines" - American Psychiatric Association, 2013), and therefore the lack of structure could conceivably have a negative impact upon the learning experience of these children. One possibility is that this is related to intolerance of uncertainty (IU), which reflects anxiety surrounding uncertain or ambiguous situations, and has been found to be related to restrictive and repetitive behaviours in autism (Wigham, Rodgers, South, McConachie, & Freeston, 2015). Furthermore, Adams, Simpson, and Keen (2020) found that for autistic children, uncertainty and performance anxiety were among the most endorsed items on a self-report anxiety questionnaire, compared to other anxiety items such as separation anxiety or anxious arousal. They also found that 83.2% of the children indicated having experienced anxiousness in the school setting. The findings of the current study not only reinforce the existing notion that anxiety is prevalent in the school environment for children with autism, but also build upon this by

providing real-world examples of *how* anxiety may impact on learning for these children.

The second theme identified was the academic environment, encompassing both the physical and contextual learning environment. Teachers spoke about the use of particular strategies, with a strong focus on structure and planning, to create a learning environment in which autistic children feel comfortable and are ready to engage with learning. Some of these factors are not necessarily specific to autism in that many children could benefit from them, however it may be the case that these factors are more exaggerated in importance for autistic children. For example, visual timetables may be useful for non-autistic children, however as a lack of structure can cause anxiety in autism it may be that this strategy would be more beneficial for autistic pupils compared to other children. Teachers also referred to the physical classroom environment, which included class size and pupil to staff ratios. Van Herwegen, Ashworth and Palikara (2018) found that pupils with ASD were less likely to receive one-to-one support compared to pupils with WS or DS, showing the potential lack of support for these pupils. SEN schools have higher staff to pupil ratios (Department for Education, 2011), and mainstream schools with SEN provision have access to smaller group or one-to-one learning opportunities that mainstream schools may not have, which links to the issue of funding. Teachers explained that if a child received a diagnosis, this would provide funding for additional support such as dedicated teaching assistants or SEN resources. The value of these resources was emphasised throughout the teachers' discourse. Previous research has found the lack of SEN resources to be an issue also important to parents (Lindsay, Ricketts, Peacey, Dockrell, & Charman, 2016). Children attending SEN schools, or schools with a SEN provision, are likely to already have a diagnosis and/or funding available, making this less of an issue from an SEN teacher's perspective. Linked to this, class size and pupil to staff ratios were also only factors mentioned by teachers in mainstream schools. There are therefore clear implications in relation to providing additional support to mainstream schools.

Finally, the qualities and skills of the teacher were considered to be important for the learning experiences of pupils with autism. This related not only to the teacher's understanding of autism, but their understanding of what an autism diagnosis meant for the individual child, which is a pre-requisite for building trust and relationships. This is a sub-theme that has also emerged in similar work. Able et al. (2015) conducted teacher focus groups on the topic of facilitating inclusion for autistic students. They reported that teachers expressed the importance of understanding autism and the learning needs of each individual child in order to effectively support them within an inclusive learning environment. As previously mentioned, parents of children with ASD have been found to be dissatisfied with the one-to-one support their child received (Van Herwegen, Ashworth, & Palikara, 2018), which was related to staff not understanding their child and/or their needs. This demonstrates the importance of these issues not only between studies but across informants.

Although the factors described focus on primary education, these themes also share some parallel with studies of older autistic individuals, such as those attending higher education (Gurbuz, Hanley, & Riby, 2019). In their study of the social and academic experiences of individuals with autism at university, Gurbuz et al. (2019) found that autistic individuals report a wide variety of social and academic factors relevant to their experience within higher education, some of which resonate with the themes that emerged within the current study, namely sensory processing, structure and routine, and the value of support/guidance from educators. This demonstrates that some of the factors that exist in the primary school classroom also continue into early adulthood, emphasising the significance of understanding these issues in childhood, with the aim of achieving better outcomes for autistic individuals.

4.1. Priorities for facilitating learning

All teachers spoke about pupil behavior and abilities during the interviews, and within this, sensory differences and anxiety were the factors most frequently referred to. These factors were also mentioned across school provision type and are known to be broadly relevant for autistic individuals as mentioned above. Together, this suggests that these factors should take high priority in terms of further investigation and targeted intervention. In terms of sensory differences, some teachers spoke about physical resources that they believed were successful in supporting children in the classroom, such as weighted blankets. Based on these observations from teachers, meeting this sensory need may enable the child to refocus their attention and engage with the learning taking place. Despite this, studies investigating the benefit of such resources upon attention or academic engagement have been inconclusive due to a lack of methodological rigor (Stephenson & Carter, 2009). Given the findings of the current study, rigorous scientific investigation of the application of such resources for children with autism would be highly valuable. Anxiety was most regularly referred to as a barrier in relation to a lack of structure or uncertainty, and teachers spoke about the successful use of planners or similar strategies for structuring the day to allow the child to focus. Related to this, some teachers highlighted the importance of understanding the child, not only in terms of their diagnosis, but also at the individual level. Taken together, an appropriate approach to facilitating learning may be to provide a toolbox of strategies and resources that teachers can draw upon, pulling out those that are appropriate for a particular child. Further research is undoubtedly necessary in order to design such a resource, however the current study highlights the factors to be prioritised for investigation.

4.2. Limitations

Although the teachers who were interviewed confirmed with the researcher that they were currently engaged in supporting at least one child with autism, it was not possible to confirm that each child they reflected upon had a formal diagnosis. As teachers were asked to reflect upon their broader experiences of teaching pupils with autism, it was not feasible to collect such data, which in some cases represented up to 100 children over a 20-year time period. It is important to acknowledge that this does impact on the generalisibility of the findings, in that it is possible teachers were drawing upon experiences with pupils who were not formally diagnosed.

Secondly, although teachers were asked questions specifically about pupils with autism, it is possible that some of the points they

raised were not necessarily specific to autism. That said, the aim of the current study was to delve deeper into the factors impacting learning for pupils with autism, not to compare across disorders or with children with different developmental needs. Furthermore, the issues that are broadly relevant for children are not any less relevant for autistic pupils. For example, the sensory aspects of the classroom could be relevant for children with sensory differences that are not meeting clinical criteria, however the relationship between sensory differences and learning may be compounded in autism due to the contribution of attention atypicalities and RRBs, both of which have found to be related to sensory processing in autism (Brandes-Aitken et al., 2018; Wigham et al., 2015). This cannot be confirmed within the current study, however future research should focus on investigating these relationships.

Thirdly, the perspectives of teachers were highly informative in terms of highlighting potential issues for autistic children and the impact upon their learning experience, however these are not direct quantitative measurements. There is no certainty that a pupil's personal experience mirrors that observed by their teacher. Research into the accuracy of teacher ratings is mixed, with some finding that relationships between teacher ratings and direct assessments were weak (Dekker, Ziermans, Spruijt, & Swaab, 2017) and others the converse (Cabel, Justice, Zucker, & Kilday, 2009). Although it was outside of the scope of this study, perspectives from autistic adults or teenagers on these topics and themes would be insightful and a clear next step for future research. Teachers' perspectives alone may not be able to identify precise cognitive and behavioural mechanisms in the pupils they teach, but they do provide a valuable insight that can inform future experimental work.

Finally, the sample size within this study is small, which is characteristic of semi-structured interviews and qualitative research more generally. Braun and Clarke (2006) recommend that 6–10 is an adequate sample size for semi-structured interviews, maintaining a balance between obtaining enough data to recognise patterns, and the resource cost of collecting, managing and analysing the data. Furthermore, other authors have commented that data saturation (i.e. the point at which no new themes emerge when interviewing additional participants) occurs at around 11 participants (Latham, 2013). Despite this justification, it is important to recognise that the small sample of participants, particularly across provision type, means that further work would be necessary in order to investigate these issues empirically.

5. Conclusion

Overall, the range of factors that teachers emphasised as having an impact on learning for autistic pupils was vast, highlighting key areas for further investigation. Analysis of the interviews with teachers indicated the existence of complex relationships that impact upon learning for children with autism, showing that there are many layers to the story of how to support these pupils to achieve their best at school. Unravelling this with the support of empirical work is an important next step prior to devising interventions.

CRediT authorship contribution statement

Emily McDougal: Conceptualization, Investigation, Methodology, Formal analysis, Writing - original draft, Funding acquisition. **Deborah M. Riby:** Conceptualization, Writing - review & editing, Supervision, Funding acquisition. **Mary Hanley:** Conceptualization, Writing - review & editing, Supervision, Funding acquisition.

Declaration of Competing Interest

The authors report no conflict of interest.

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